

PINEVIEW RESERVOIR



Introduction

Pineview Reservoir is a large impoundment of the Ogden River at the top of Ogden Canyon. Close proximity urban areas make this large reservoir a popular location for four season water recreation. The dam was built by the Bureau of Reclamation with federal funds to relieve Wasatch Front communities of the cost of storing their own

water. There are several boating and swimming areas on this popular reservoir. Huntsville is a small community on the lower of two peninsulas on the reservoir. It was partially inundated when the impoundment was created, and the cemetery eventually had to be moved from the tip of the peninsula when wave action began unearthing coffins. Pineview Reservoir was created in 1937 by the

Characteristics and Morphometry

Lake elevation (meters / feet)	1,493 / 4,900
Surface area (hectares / acres)	1,163 / 2,874
Watershed area (hectares / acres)	54,100 / 153,000
Volume (m <sup>3</sup> / acre-feet)	
capacity	135,684,000 / 109,999
conservation pool	none
Annual inflow (m <sup>3</sup> / acre-feet)	
Retention time (years)	
Drawdown (m <sup>3</sup> / acre-feet)	32,330,085 / 26,210
Depth (meters / feet)	
maximum	25 / 81
mean	13.4 / 43.97
Length (km / miles)	7.1 / 4.4
Width (km / miles)	5.8 / 3.6
Shoreline (km / miles)	39 / 24.2

Location

County	Weber
Longitude / Latitude	111 48 28 / 41 16 00
USGS Map	Huntsville, 1991
DeLorme's Utah Atlas & Gazetteer™	Page 60, C-3
Cataloging Unit	Lower Weber (16020102)

construction of an earth-fill dam. The shoreline is 98% owned by the Wasatch-Cache National Forest, and public access is 100% open. Water is used for culinary purposes (15%), irrigation (85%), as well as recreation, fish habitat, and hydroelectric generation. A greater proportion of

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is expected to be used for culinary purposes as suburban development continues to displace agricultural land.

### Recreation

Paved roads encircle the reservoir, but because of the undulating shoreline, the roads are set back a significant distance in most areas. The south shore is accessible from U-39 between the Pineview Dam and Huntsville, the lower peninsula from West Baseline Street in Huntsville, the east and north shores from U-166 between Huntsville and Eden, and the west shore from U-162 between Eden and the Pineview Dam.

The two USFS campsites are on the south shore, Anderson Cove and Jefferson Hunt. Both have picnic areas, swimming areas, boat ramps, toilets, and campsites (29 at Jefferson, 96 at Anderson). Other swimming areas are on the lower peninsula (Bluffs Recreation Area) and the east shore just north of Huntsville (Middle Inlet Swim Area). Additional boatramps (Port Recreation Area) and a private marina are on the west shore. Camping is only permitted in designated areas. Maps are available at the Ogden Ranger District offices in Ogden.



Fishing, boating, sailing, sailboarding, swimming, camping, picnicking, ice fishing, and water skiing are all popular.

### Watershed Description

Pineview Reservoir is an impoundment of the Ogden River at the top of Ogden Canyon. The Ogden River flows through the Wasatch Front, and the dam impounds the reservoir in Ogden Valley, which is behind the Wasatch Front. The reservoir has three major arms with two peninsulas separating them. The area to the north, east, and south is relatively flat, while the back of the Wasatch Front bounds the west shore. Huntsville and Eden are two small communities along the shore, with the remainder of the area being agricultural. Summer home development

has and will continue to take place on the lower slopes of the mountains west of the reservoir.

The Wasatch Mountains uplifted slowly as a block fault, so streams were able to cut their canyons as the mountains uplifted. The softer strata behind the mountains has been eroded away to form the valley. The north end of the valley drained out North Ogden Canyon until fairly recent past (in geologic time), but has now been captured by the Ogden River, and the canyon is dry.

The major portion of the snowpack falls in the south end of the Monte Cristo Range, to the east of Huntsville. Large areas of these mountains collect in excess of 25 inches precipitation annually. The range is of ancient origin, and has been more recently exposed by uplift (more details are in the Causey Reservoir report).

The watershed high point, Willard Peak, is 2,976 m (9,764 ft) above sea level, thereby developing a complex slope of 9.3% to the reservoir. The average stream gradient above the reservoir is 5.92% (310 feet per mile). The inflows are the South Branch South Fork [Ogden River], North Branch South Fork [Ogden River], Spring Creek, Middle Fork [Ogden River], and the North Fork [Ogden River]. There are also a number of ephemeral streams and agricultural runoff ditches. The outlet is the Ogden River and the Ogden Canyon Conduit. Causey Reservoir is an upstream impoundment of the South Fork. It is also a Bureau of Reclamation facility.

The watershed is made up of high mountains, foothills, terraces, and mountain valleys. The soil associations that compose the watershed are listed in Appendix III.

The vegetation communities consist of urban, cropland and grazing lands, sage-grass, oak, maple, pine, aspen, and spruce-fir. The watershed receives 51 - 102 cm (20 - 40 inches) of precipitation annually. The frost-free season around the reservoir is 80 - 140 days per year.

Estimated land use is as follows (largest to smallest): domestic grazing on private lands; multiple use (grazing, wildlife habitat, recreation, and watershed recharge) on National Forest Lands, agriculture, urban and summer home areas, and recreation.

### Limnological Assessment

The water quality of Pineview Reservoir is good. It is considered to be moderately hard with a hardness concentration value of approximately 119 mg/L (CaCO<sub>3</sub>). The parameters that have exceeded State water quality standards for defined beneficial uses are total phosphorus, temperature and dissolved oxygen. Dissolved oxygen depletion usually occurs after the lake stratifies and the demand in the hypolimnion exceeds the exchange in the lower levels of the reservoir. A review of the phosphorus data shows that it is well below the State pollution

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indicator value of 25 ug/L during the first period of monitoring for 1992 (average 15.5 ug/L). However under management operations of the reservoir, a premature overturn of the reservoir is induced by the early seasonal release of appropriated irrigation water for downstream needs. The average concentration rises to 55.3 ug/L which not only exceeds the indicator level but provides the stimulus for algal blooms on the reservoir. In addition with the lower volumes of water present in the reservoir the temperature regime increases and exceedences of the criteria (20°C) for a cold water fishery occur.

Although in 1981 the reservoir was characterized as a phosphorus limited system, the 1990-92 data suggest that the reservoir is currently a nitrogen limited system. The NES determined that the reservoir was phosphorus limited on September 23, 1975.

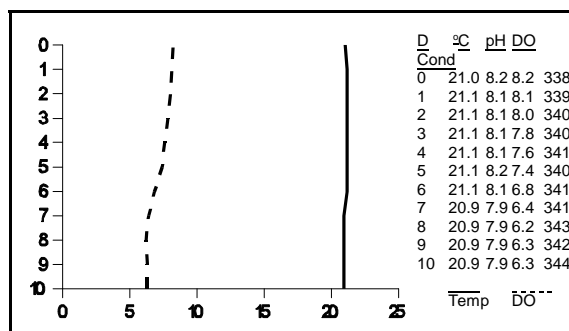
From 1988-90 a Clean Lakes Phase I Study was conducted on the reservoir with Weber Basin Water Quality Management Council. The study reports that the

reservoir hydrology exhibits a controlling influence on the limnology of the reservoir. Pineview Reservoir has a capacity of 110,000 acre-feet with an allotment of 44,000 acre-feet to meet downstream irrigation requirements. It normally begins to stratify in early June becoming strongly stratified by late June or early July. Due to the morphology of the reservoir and early withdrawals to meet irrigation requirements downstream, stratification breaks down and reservoir mixes (turnover). This is evidenced by the uniformity of the water as depicted in the August 24, 1992 profile. This early mixing results in an increase of nutrients in the photic zone (epilimnion) causing an algae bloom in mid to late August. As indicated earlier during early summer, the upper water in the reservoir is fairly low in nutrients but the lower levels have higher concentration of phosphorus and nitrogen. Data from the report indicates that the high nitrate inflow during April is primarily due to runoff from frozen pasture lands where waste management practice could improve. It should also be noted that approximately 20,000 acre-feet of groundwater with nitrate concentrations averaging approximately 2.0 mg/L enters the reservoir during the summer. Most of this water probably enters the hypolimnion due to the density of the water and the point of discharge which adds to the nitrate loading in the lower waters of the reservoir. As the reservoir overturns and this nutrient rich water becomes available for production algal blooms intensify and cause concerns and impacts to the reservoir.

TSI values indicate that the reservoir is in fact an eutrophic reservoir. The higher rate of productivity is definitely pronounced during the later part of summer.

According to DWR no fish kills have been reported in recent years. However from early July through fall the waters of Pineview Reservoir are mostly unsuitable for trout due to temperature increases and the dissolved oxygen decreases. The fish attempt to find more optimum habitat by migrating to the inflows, or downlake where the dam impedes their search for cooler water. At the inlets they find somewhat cooler temperatures due to the inflowing water. This tributary flow, however, is extremely low due to upstream irrigation needs. Near the dam the

Limnological Data			
Data averaged from STORET sites: 49281, 49282, 49283, 49284			
Surface Data	1980	1992	
Trophic Status	E	E	
Chlorophyll TSI		61.40	
Secchi Depth TSI	52.96	57.49	
Phosphorous TSI	47.77	56.05	
Average TSI	50.37	58.31	
Chlorophyll <i>a</i> (ug/L)	-	23.2	
Transparency (m)	1.6	1.12	
Total Phosphorous (ug/L)	20.6	37	
pH	8.1	7.4	
Total Susp. Solids (mg/L)	7.9	9	
Total Volatile Solids (mg/L)	-	5	
Total Residual Solids (mg/L)	-	3	
Temperature (°C / °f)	20/68	20/68	
Conductivity (umhos.cm)	243	315	
Water Column Data			
Ammonia (mg/L)	0.07	0.05	
Nitrate/Nitrite (mg/L)	0.38	0.05	
Hardness (mg/L)	98	149	
Alkalinity (mg/L)	100	138	
Silica (mg/L)	7.6	0.5	
Total phosphorous (ug/L)	23.5	42	
Miscellaneous Data			
Limiting Nutrient	N	N	
DO (Mg/l) at 75% depth	0.3	6.3	
Stratification (m)	11-12	NO	
Depth at Deepest Site (m)	16	10	



temperature of the water increases. As the cooler hypolimnetic waters are discharged, the higher temperature regime is drawn down in the water column. In addition dissolved oxygen is depleted from the hypolimnion. The fish become stressed and are preyed upon by anchorworm (*Lerne* sp.) and secondary bacterial infections. Fish mortality is considerable. In 1987 Utah Wildlife Resources stopped stocking trout in Pineview Reservoir because of poor survival related to poor water quality. In 1988 they stocked 6,000 tiger musky and introduced small bass. Those fisheries present in order of relative abundance include; yellow perch (*Perca flavescens*), black crappie (*Pomoxis nigromaculatus*), black bullhead (*Ictalurus melas*), carp (*Cyprinus carpio*), bluegill (*Lepomis macro*, largemouth bass (*Micropterus salmoides*), smallmouth bass, and tiger musky (*Esox lucius* crossed with *Esox masquinongy*). DWR is continuing to stock fingerling tiger muskies and smallmouth bass in the reservoir. The reservoir was been chemically treated by the DWR in 1959 and 1970 to eliminate rough fish competition, so populations of native Ogden River fish are probably not present.

Phytoplankton identified in 1975 by the EPA NES, in order of relative abundance included *Chroomonas* sp., *Cryptomonas* sp., *Fragilaria* sp., *Chlamydomonas* sp., *Cryptomonas* sp., *Fragilaria* sp., *Chlamydomonas* sp., *Schroderia* sp., *Aphanizomenon* sp., and *Stephanodiscus* sp..

Phytoplankton in the euphotic zone include the following taxa (in order of dominance)

Species	Cell Volume (mm <sup>3</sup> /liter)	% Density By Volume
<i>Stephanodiscus niagarae</i>	22.1	75
<i>Gomphosphaeria aponina</i>	1.021	40.11
<i>Microcystis aeruginosa</i>	4.893	9.34
<i>Fragilaria crotonensis</i>	0.687	1.31
<i>Coelastrum</i> sp.	0.556	1.06
<i>Asterionella formosa</i>	0.473	0.90
<i>Pandorina morum</i>	0.222	0.42
<i>Melosira granulata</i>	0.173	0.33
<i>Botryococcus sudeticus</i>	0.150	0.29
Centric diatoms	0.107	0.20
<i>Trachelomonas</i> sp.	0.089	0.17
<i>Cosmarium</i> sp.	0.077	0.15
<i>Oocystis</i> sp.	0.071	0.14
Pennate diatoms	0.033	0.06
Unknown spherical		
green alga	0.033	0.06
<i>Euglena</i> sp.	0.008	0.02
<i>Scenedesmus</i> sp.	0.008	0.02

Total 50.804

Shannon-Weaver [H'] 1.32  
Species Evenness 0.46  
Species Richness 0.69

The phytoplankton community is dominated by the presence of diatoms and blue-green algae which are

#### Information

##### Management Agencies

Wasatch Front Regional Council	292-4469
Division of Wildlife Resources	538-4700
Division of Water Quality	538-6146
Wasatch-Cache National Forest	524-5030
Ogden Ranger District	625-5112

##### Recreation

Golden Spike Empire Travel Region (Ogden)	627-8288
Ogden Chamber of Commerce	621-8300

##### Reservoir Administrators

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indicative of eutrophic conditions.

#### Pollution Assessment

Nonpoint pollution sources include the following: agriculture return flows; grazing; recreation; construction; and urban activities.

Currently there are no point sources of pollution in the watershed.

#### Beneficial Use Classification

The state beneficial use classifications include: culinary water (1A), recreational bathing (swimming) (2A), boating and similar recreation (excluding swimming) (2B), cold water game fish and organisms in their food chain (3A) and agricultural uses (4).

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